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<110> Havkin-Frenkel, Daphna
Podstolski, Andrzej
Dixon, Richard A.

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<151> 2000-05-22

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<151> 1998-07-15

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<151> 2001-02-28

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cctgccatcc tcggcgtcct tggcagttgc cgccacgcct tccacttcgc acggttcgcc 180

cgcaggtacg ggaagagcta cggatcggag gaggagatca agaagaggtt cgggatcttc 240

gtggagaatc tagcgtttat ccggtccact aatcggaagg atctgtcgta taccctagga 300

atcaaccaat tcgccgacct gacctgggag gaattccgga ccaatcgcct tggtgcggcg 360

cagaactgct cggcgactgc gcatggaaac caccggtttg tcgatggcgt gcttcctgta 420

acgagggatt ggagggagca agggatagtg agccctgtaa aggaccaagg aagctgtgga 480

tcttgctgga ctttcagtac tactggagca ctagaggctg catatacaca gctaactgga 540

aagagcacat cattatctga acagcaactt gtggactgtg cctcagcatt caataacttt 600

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gacacagaac agacttatcc ataccttggt gtcaatggta tctgcaactt caagcaggag 720

aatgttggtg tcaaggtcat tgattcgata aacatcaccc tgggtgctga ggatgagttg 780

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aatctgtaca agaaaggtgt atacagcagt gacacctgtg gaagagatcc aatggatgtg 900

aaccacgcag ttcttgccgt cggttatgga gtcgaggacg ggattcctta ttggctcatc 960

aagaactcat ggggtacaaa ttggggtgac aatggctact ttaagatgga actcggcaag 1020

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Thr Gln Arg Pro Asp Ser Ile Glu Pro Ala Ile Leu Gly Val Leu Gly
35 40 45

Ser Cys Arg His Ala Phe His Phe Ala Arg Phe Ala Arg Arg Tyr Gly
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Lys Ser Tyr Gly Ser Glu Glu Glu Ile Lys Lys Arg Phe Gly Ile Phe
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Val Glu Asn Leu Ala Phe Ile Arg Ser Thr Asn Arg Lys Asp Leu Ser
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Tyr Thr Leu Gly Ile Asn Gln Phe Ala Asp Leu Thr Trp Glu Glu Phe
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Arg Thr Asn Arg Leu Gly Ala Ala Gln Asn Cys Ser Ala Thr Ala His
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Gly Asn His Arg Phe Val Asp Gly Val Leu Pro Val Thr Arg Asp Trp
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Arg Glu Gln Gly Ile Val Ser Pro Val Lys Asp Gln Gly Ser Cys Gly
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Ser Trp Thr Phe Ser Thr Thr Gly Ala Leu Glu Ala Ala Tyr Thr Gln
165 170 175

Leu Thr Gly Ser Thr Leu Ser Glu Gln Gln Leu Val Asp Cys Ala Ser
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Ala Phe Asn Asn Phe Gly Cys Gly Gly Leu Pro Ser Gln Ala Phe Glu
195 200 205

Tyr Val Lys Tyr Asn Gly Gly Ile Asp Thr Glu Gln Thr Tyr Pro Tyr
210 215 220

Leu Gly Val Met Gly Ile Cys Asn Phe Lys Gln Glu Asn Val Gly Val
225 230 235 240

Lys Val Ile Asp Ser Ile Asn Ile Thr Leu Gly Ala Glu Asp Glu Leu
245 250 255

Lys His Ala Val Gly Leu Val Arg Pro Val Ser Val Ala Phe Glu Val
260 265 270

Val Lys Gly Phe Asn Leu Tyr Lys Lys Gly Val Tyr Ser Ser Asp Thr
275 280 285

Cys Gly Arg Asp Pro Met Asp Val Asn His Ala Val Leu Ala Val Gly
290 295 300

Tyr Gly Val Glu Asp Gly Ile Pro Tyr Trp Leu Ile Lys Asn Ser Trp
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<223> 4HBS P3b

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35 40 45

Ile Leu Gly Gln Ser Arg His Val Leu Ser Phe Ala Arg Phe Thr His
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Arg Tyr Gly Lys Lys Tyr Gln Asn Val Glu Glu Met Lys Leu Arg Phe
65 70 75 80

Ser Ile Phe Lys Glu Asn Leu Asp Leu Ile Arg Ser Thr Asn Lys Lys
85 90 95

Gly Leu Ser Tyr Lys Leu Gly Val Asn Gln Phe Ala Asp Leu Thr Trp
100 105 110

Gln Glu Phe Gln Arg Thr Lys Leu Gly Ala Ala Gln Asn Cys Ser Ala
115 120 125

Thr Leu Lys Gly Ser His Lys Val Thr Glu Ala Ala Leu Pro Glu Thr
130 135 140

Lys Asp Trp Arg Glu Asp Gly Ile Val Ser Pro Val Lys Asp Gln Gly
145 150 155 160

Gly Cys Gly Ser Cys Trp Thr Phe Ser Thr Thr Gly Ala Leu Glu Ala
165 170 175

Ala Tyr His Gln Ala Phe Ala Phe Gly Lys Gly Ile Ser Leu Ser Glu
180 185 190

Gln Gln Leu Val Asp Cys Ala Gly Ala Phe Asn Asn Tyr Gly Cys Asn
195 200 205

Gly Gly Leu Pro Ser Gln Ala Phe Glu Tyr Ile Lys Ser Asn Gly Gly
210 215 220

Leu Asp Thr Glu Lys Ala Tyr Pro Tyr Thr Gly Lys Asp Glu Thr Cys
225 230 235 240

Lys Phe Ser Ala Glu Asn Val Gly Val Gln Val Leu Asn Ser Val Ser
245 250 255

Ile Thr Leu Gly Ala Glu Asp Glu Leu Lys His Ala Val Gly Leu Val
260 265 270

Arg Pro Val Ser Ile Ala Phe Glu Val Ile His Ser Phe Arg Leu Tyr
275 280 285

Lys Ser Gly Val Tyr Thr Asp Ser His Cys Gly Ser Thr Pro Met Asp
290 295 300

Val Asn His Ala Val Leu Ala Val Gly Tyr Gly Val Glu Asp Gly Val
305 310 315 320

Pro Tyr Trp Leu Ile Lys Asn Ser Trp Gly Ala Asp Trp Gly Asp Lys
325 330 335

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Cys Ala Ser Tyr Pro Val Val Ala
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Leu Gly Ala Leu Gly Arg Thr Arg His Ala Leu Arg Phe Ala Arg Phe
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Ala Val Arg Tyr Gly Lys Ser Tyr Glu Ser Ala Ala Glu Val Arg Arg
65 70 75 80

Arg Phe Arg Ile Phe Ser Glu Ser Leu Glu Glu Val Arg Ser Thr Asn
85 90 95

Arg Lys Gly Leu Pro Tyr Arg Leu Gly Ile Asn Arg Phe Ser Asp Met
100 105 110

Ser Trp Glu Glu Phe Gln Ala Thr Arg Leu Gly Ala Ala Gln Thr Cys
115 120 125

Ser Ala Thr Lys Gly Asn His Leu Met Arg Asp Ala Ala Ala Leu Pro
130 135 140

Glu Thr Lys Asp Trp Arg Glu Asp Gly Ile Val Ser Pro Val Lys Asn
145 150 155 160

Gln Ala His Cys Gly Ser Cys Trp Thr Phe Ser Thr Thr Gly Ala Leu
165 170 175

Glu Ala Ala Tyr Thr Gln Ala Thr Gly Lys Asn Ile Ser Leu Ser Glu
180 185 190

Gln Gln Leu Val Asp Cys Ala Gly Gly Phe Asn Asn Phe Gly Cys Asn

195 200 205

Gly Gly Leu Pro Ser Gln Ala Phe Glu Tyr Ile Lys Tyr Asn Gly Gly
210 215 220

Ile Asp Thr Glu Glu Ser Tyr Pro Tyr Lys Gly Val Asn Gly Val Cys
225 230 235 240

His Tyr Lys Ala Glu Asn Ala Ala Val Gln Val Leu Asp Ser Val Asn
245 250 255

Ile Thr Leu Asn Ala Glu Asp Glu Leu Lys Asn Ala Val Gly Leu Val
260 265 270

Arg Pro Val Ser Val Ala Ala Phe Gln Val Ile Asp Gly Phe Arg Gln
275 280 285

Tyr Lys Ser Gly Val Tyr Thr Ser Asp His Cys Gly Thr Thr Pro Asp
290 295 300

Asp Val Asn His Ala Val Leu Ala Val Gly Tyr Gly Val Glu Asn Gly
305 310 315 320

Val Pro Tyr Trp Leu Ile Lys Asn Ser Trp Gly Ala Asp Trp Gly Asp
325 330 335

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35 40 45

Leu Gln Val Val Gly Lys Thr Arg His Ala Leu Ser Phe Ala Arg Phe
50 55 60

Ala His Arg Tyr Gly Lys Arg Tyr Glu Ser Val Glu Glu Ile Lys Gln
65 70 75 80

Arg Phe Glu Val Phe Leu Asp Asn Leu Lys Met Ile Arg Ser His Asn
85 90 95

Lys Lys Gly Leu Ser Tyr Lys Leu Gly Val Asn Glu Phe Thr Asp Leu
100 105 110

Thr Trp Asp Glu Phe Arg Arg Asp Arg Leu Gly Ala Ala Gln Asn Cys
115 120 125

Ser Ala Thr Thr Lys Gly Asn Leu Lys Val Thr Asn Val Val Leu Pro
130 135 140

Glu Thr Lys Asp Trp Arg Glu Ala Gly Ile Val Ser Pro Val Lys Asn
145 150 155 160

Gln Gly Lys Cys Gly Ser Cys Trp Thr Phe Ser Thr Thr Gly Ala Leu
165 170 175

Glu Ala Ala Tyr Ser Gln Ala Phe Gly Lys Gly Ile Ser Leu Ser Glu
180 185 190

Gln Gln Leu Val Asp Cys Ala Gly Ala Phe Asn Asn Phe Gly Cys Asn
195 200 205

Gly Gly Leu Pro Ser Gln Ala Phe Glu Tyr Ile Lys Ser Asn Gly Gly
210 215 220

Leu Asp Thr Glu Glu Ala Tyr Pro Tyr Thr Gly Lys Asn Gly Leu Cys
225 230 235 240

Lys Phe Ser Ser Glu Asn Val Gly Val Lys Val Ile Asp Ser Val Asn
245 250 255

Ile Thr Leu Gly Ala Glu Asp Glu Leu Lys Tyr Ala Val Ala Leu Val
260 265 270

Arg Pro Val Ser Ile Ala Phe Glu Val Ile Lys Gly Phe Lys Gln Tyr
275 280 285

Lys Ser Gly Val Tyr Thr Ser Thr Glu Cys Gly Asn Thr Pro Met Asp
290 295 300

Val Asn His Ala Val Leu Ala Val Gly Tyr Gly Val Glu Asp Gly Val
305 310 315 320

Pro Tyr Trp Leu Ile Lys Asn Ser Trp Gly Ala Asp Trp Gly Asp Glu
325 330 335

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35 40 45

Ala Leu Gly Arg Thr Arg Asp Ala Leu Arg Phe Ala Arg Phe Ala Val
50 55 60

Arg Tyr Gly Lys Ser Tyr Glu Ser Ala Ala Glu Val His Lys Arg Phe
65 70 75 80

Arg Ile Phe Ser Glu Ser Leu Gln Leu Val Arg Ser Thr Asn Arg Lys
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Gly Leu Ser Tyr Arg Leu Gly Ile Asn Arg Phe Ala Asp Met Ser Trp
100 105 110

Glu Glu Phe Arg Ala Thr Arg Leu Gly Ala Ala Gln Asn Cys Ser Ala
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Thr Leu Thr Gly Asn His Arg Met Arg Ala Ala Ala Val Ala Leu Pro
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Glu Thr Lys Asp Trp Arg Glu Asp Gly Ile Val Ser Pro Val Lys Asn
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Gln Gly His Cys Gly Ser Cys Trp Thr Phe Ser Thr Thr Gly Ala Leu
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Glu Ala Ala Tyr Thr Gln Ala Thr Gly Lys Pro Ile Ser Leu Ser Glu
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Gln Gln Leu Val Asp Cys Gly Leu Ala Phe Asn Asn Phe Gly Cys Asn
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Gly Gly Leu Pro Ser Gln Ala Phe Glu Tyr Ile Lys Tyr Asn Gly Gly
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Lys Phe Lys Asn Glu Asn Val Gly Val Lys Val Leu Asp Ser Val Asn
245 250 255

Ile Thr Leu Gly Ala Glu Asp Glu Leu Lys Asp Ala Val Gly Leu Val
260 265 270

Arg Pro Val Ser Val Ala Phe Glu Val Ile Thr Gly Phe Arg Leu Tyr
275 280 285

Lys Ser Gly Val Val Thr Ser Asp His Cys Gly Thr Thr Pro Met Asp
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Val Asn His Ala Val Leu Ala Val Gly Tyr Gly Val Glu Asp Gly Val
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Pro Tyr Trp Leu Ile Lys Asn Ser Trp Gly Ala Asp Trp Gly Asp Glu
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Cys Ala Ser Tyr Pro Ile Val Ala
355 360

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Phe Ala Val Arg Tyr Gly Lys Ser Tyr Glu Ser Ala Ala Glu Val His
65                  70                  75                  80

Lys Arg Phe Arg Ile Phe Ser Glu Ser Leu Gln Leu Val Arg Ser Thr
                85                  90                  95

Asn Arg Lys Gly Leu Ser Tyr Arg Leu Gly Tyr Asn Arg Phe Ala Asp
            100                 105                 110

Met Ser Trp Glu Glu Phe Arg Ala Thr Arg Leu Gly Ala Ala Gln Asn
        115                 120                 125

Cys Ser Ala Thr Leu Thr Gly Asn His Arg Met Arg Ala Ala Ala Val
    130                 135                 140

Ala Leu Pro Glu Thr Lys Asp Trp Arg Glu Asp Gly Ile Val Ser Pro
145                 150                 155                 160

Val Lys Asn Gln Gly His Cys Gly Ser Cys Trp Thr Phe Ser Thr Thr
                165                 170                 175

Gly Ala Leu Glu Ala Ala Tyr Thr Gln Ala Thr Gly Lys Pro Ile Ser
            180                 185                 190

Leu Ser Glu Gln Gln Leu Val Asp Cys Gly Phe Ala Phe Asn Asn Phe
        195                 200                 205

Gly Cys Asn Gly Gly Leu Pro Ser Gln Ala Phe Glu Tyr Ile Lys Tyr
    210                 215                 220

Asn Gly Gly Leu Asp Thr Glu Glu Ser Tyr Pro Tyr Gln Gly Val Asn
225                 230                 235                 240

Gly Ile Cys Lys Phe Lys Asn Glu Asn Val Gly Val Lys Val Leu Asp
                245                 250                 255

Ser Val Asn Ile Thr Leu Gly Ala Glu Asp Glu Leu Lys Asp Ala Val
            260                 265                 270

Gly Leu Val Arg Pro Val Ser Val Ala Phe Glu Val Ile Thr Gly Phe
        275                 280                 285
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Arg Leu Tyr Lys Ser Gly Val Tyr Thr Ser Asp His Cys Gly Thr Thr
290 295 300

Pro Met Asp Val Asn His Ala Val Leu Ala Val Gly Tyr Gly Val Glu
305 310 315 320

Asp Gly Val Pro Tyr Trp Leu Ile Lys Asn Ser Trp Gly Ala Asp Trp
325 330 335

Gly Asp Glu Gly Tyr Phe Lys Met Glu Met Gly Lys Asn Met Cys Gly
340 345 350

Val Ala Thr Cys Ala Ser Tyr Pro Ile Val Ala
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Pro Ile Arg Ser Val Thr Asp His Ala Ala Ser Ala Leu Glu Ser Thr
35 40 45

Val Ile Ala Ala Leu Gly Arg Thr Arg Gly Ala Leu Arg Phe Ala Arg
50 55 60

Phe Ala Val Arg Gly His Lys Arg Tyr Gly Asp Ala Ala Glu Val Gln
65 70 75 80

Arg Arg Phe Arg Ile Phe Ser Glu Ser Leu Glu Leu Val Arg Ser Thr
85 90 95

Asn Arg Arg Gly Leu Pro Tyr Arg Leu Gly Ile Asn Arg Phe Ala Asp
100 105 110

Met Ser Trp Glu Glu Phe Gln Ala Ser Arg Leu Gly Ala Ala Gln Asn
115 120 125

Cys Ser Ala Thr Leu Ala Gly Asn His Arg Met Arg Asp Ala Pro Ala
130 135 140

Leu Pro Glu Thr Lys Asp Trp Arg Glu Asp Gly Ile Val Ser Pro Val

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Lys Asp Gln Gly His Cys Gly Ser Cys Trp Pro Phe Ser Thr Thr Gly
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Ser Leu Glu Ala Arg Tyr Thr Gln Ala Thr Gly Pro Pro Val Ser Leu
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Ser Glu Gln Gln Leu Ala Asp Cys Ala Thr Arg Tyr Asn Asn Phe Gly
        195                 200                 205

Cys Ser Gly Gly Leu Pro Ser Gln Ala Phe Glu Tyr Ile Lys Tyr Asn
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Gly Gly Leu Asp Thr Glu Glu Ala Tyr Pro Tyr Thr Gly Val Asn Gly
225                 230                 235                 240

Ile Cys His Tyr Lys Pro Glu Asn Ala Gly His Lys Val Leu Asp Ser
                245                 250                 255

Val Asn Ile Thr Leu Val Ala Glu Asp Glu Leu Lys Asn Ala Val Gly
            260                 265                 270

Leu Val Arg Pro Val Ser Val Ala Phe Gln Val Ile Asn Gly Phe Arg
        275                 280                 285

Met Tyr Lys Ser Gly Val Tyr Thr Ser Asp His Cys Gly Thr Ser Pro
    290                 295                 300

Met Asp Val Asn His Ala Val Leu Ala Val Gly Tyr Gly Val Glu Asn
305                 310                 315                 320

Gly Val Pro Tyr Trp Leu Ile Lys Asn Ser Trp Gly Ala Asp Trp Gly
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Asp Asn Gly Tyr Phe Thr Met Glu Met Gly Lys Asn Met Cys Gly Ile
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Ala Thr Cys Ala Ser Tyr Pro Ile Val Ala
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